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PAR 213

29 Feb 64

SUBJECT: Color Reproduction Systems Review

TASK/PROBLEM

In view of the recent importance attached to color photography by the intelligence community, investigate and determine most suitable means to reproduce and utilize multiple copies of color materials. Determine most suitable reproduction system and types of equipments to be used in all phases of the reproduction cycle. Also attempt to define how color photography can best be utilized by the photo interpreter.

DISCUSSION

A working program outlining the preliminary phase of the study is nearing completion. Film transparencies, paper prints and enlargements are being generated from selected available original material. These items will be studied and analyzed.

Color reversal and negative material will also be considered depending on the availability of suitable original film. The use of intermediate negative materials will be included where applicable and where such materials will contribute to improved color quality in the final prints or transparencies.

PLANNED ACTIVITIES

Continue investigation of the preliminary phase as discussed above. Target date for completion of this phase is the last quarter of F. Y. 1964.

6 Dec 63

STUDY PROGRAM OBJECTIVE

Color Reproduction Systems Review (PAR-213)

Problem

Since the use of color in the photoreconnaissance has become important only recently, there are many gaps in system required to produce and utilize the multiple copies required by the intelligence community. These gaps include the lack of knowledge upon which to base the selection of the most suitable reproduction system, lack of hardware to handle color materials in all elements of the reproduction cycle and finally a lack of definite knowledge as to the way in which the photo interpreter can best utilize color.

Development Proposal

In order to present a comprehensive report on the equipment available for the utilization of potential Color Duplicating Films, a survey will be made to tabulate available hardware items and their characteristics as applied to color reproduction. This survey will include a study of the compatibility of the equipment with the various color duplicating systems now currently recognized, and the possibilities of applying such equipment to new systems in the development stages. Where there appears to be a lack of suitable hardware, recommendations will be prepared for the needed items.

Included in this survey will be such categories as:

1. Color Duplicating Materials

A survey of available color duplicating materials will be made to determine what combinations might best be suited for high quality color reproductions. Based on the inherent characteristics of each duplicating material, the most promising combinations will be tested and evaluated for its suitability as part of a color reproduction system. In evaluating the end products, emphasis will be placed on such quality factors as resolution, color rendition and reproducibility.

It is proposed that the following general color systems be evaluated in both one to one and enlarging modes.

(a) Negative - Positive System

(1) Color Negative to Color Positive Transparency
(2) Color Negative to Color Positive Reflection Print

(b) Intermediate System

(1) Color Positive Original to Internegative to Color Positive Transparency.

(2) Color Positive Original to Internegative to Color Reflection Print.

(c) Reversal System

(1) Color Positive Original to Color Positive Transparency.

2. Color Duplicating Equipment (Film & Paper)

The survey of duplicating equipment and related hardware will include the selection of suitable process chemistry and process control.

(a) Contact Printers

(1) Continuous Printers (high output)
(2) Step Printers
(3) Light Source

(b) Enlarging Printers

(1) Continuous Enlarging (high output)
(2) Step Enlarging
(3) Light Sources
(4) Optical Printers 1:1

3. Color Processing Equipment & Dryers

(1) Continuous Machines (high output)
(2) Continuous Machines (drum type)
(3) Continuous Machines (roller transport)
(4) Basket-Tank Type (high agitation)

4. Post-Processing Equipment

(1) Film Cleaning Equipment
(2) Film Lubricating Machines

5. Display & Viewing Equipment

(a) Transparencies

(1) Film Viewers
(2) Variable Area Viewers (up to 20" x 24")
(3) Stereo Viewers (Color and Black-White Combinations)
(4) Light Sources

(b) Reflection Prints

(1) Illuminated Viewing Frames (for briefing copy)
(2) Stereo Viewers (Color and Black-White Combinations)
(3) Dry Mounting Equipment

In the general area of printing and processing, emphasis will be placed on versatility of equipment items, such as one printer or one processor type, where feasible, to serve for both color films and color paper materials. Also the use of color processors and printers for small field units, as compared to permanent installations will be part of the study.

It is believed the results of this study will systematically uncover problem areas, indicate where action should be taken, and determine:

1. What are the real problems and their magnitude?

2. What available items of equipment and techniques will solve the problems?

3. What deficiencies in equipment or methods are evident?

4. What should be done to eliminate the deficiencies?

A large part of this study will necessarily involve an investigation of all available literature, catalogues, materials, etc. However, it is anticipated that in some areas, practical testing will be required in order to reach logical conclusions, and in some instances the fabrication of breadboard equipment will be needed for evaluation and demonstration.

The main objective of the proposed study is to provide and organize data pertaining to existing color reproduction systems, to assist in evaluating this data, and to demonstrate to what degree the full exploitation of color will add to the information obtained from the black and white systems now in use.